

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Kie Y. Ahn et al.

Title: LANTHANIDE OXIDE / HAFNIUM OXIDE DIELECTRIC LAYERS

Docket No.: 1303.101US1

Filed: June 24, 2003

Examiner: Unknown



Serial No.: 10/602323

Due Date: N/A

Group Art Unit: 2812

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

- ☒ A return postcard.
- ☒ A Communication Concerning Related Applications (4 pgs.).
- ☒ An Information Disclosure Statement (2 pgs.), Form 1449 (2 pgs.), and copies of 28 cited documents.

If not provided for in a separate paper filed herewith, Please consider this a **PETITION FOR EXTENSION OF TIME** for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.

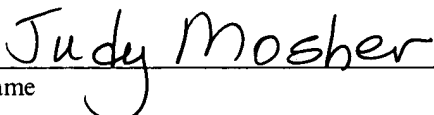
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By: 

Atty: David R. Cochran

Reg. No. 46,632

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Name


Signature

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.

(GENERAL)

S/N 10/602323



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Kie Y. Ahn et al.	Examiner:	Unknown
Serial No.:	10/602323	Group Art Unit:	2812
Filed:	June 24, 2003	Docket:	1303.101US1
Title:	LANTHANIDE OXIDE / HAFNIUM OXIDE DIELECTRIC LAYERS		

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the enclosed materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicants respectfully request that this Information Disclosure Statement be entered and the documents listed on the attached Form 1449 be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicants request that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicants with the next official communication.

Pursuant to 37 C.F.R. §1.97(b), it is believed that no fee or statement is required with the Information Disclosure Statement. However, if an Office Action on the merits has been mailed, the Commissioner is hereby authorized to charge the required fees to Deposit Account No. 19-0743 in order to have this Information Disclosure Statement considered.

INFORMATION DISCLOSURE STATEMENT

Serial No :10/602323

Filing Date: June 24, 2003

Title: LANTHANIDE OXIDE / HAFNIUM OXIDE DIELECTRIC LAYERS

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The Examiner is invited to contact the Applicants' Representative at the below-listed telephone number if there are any questions regarding this communication.

Respectfully submitted,

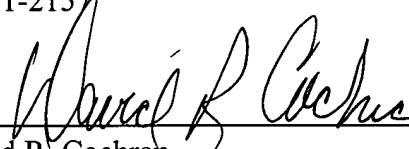
KIE Y. AHN ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 371-2157

Date 8 APRIL 2004

By


David R. Cochran
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Judy Mosher
Name

Judy Mosher
Signature

S/N 10/602323

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Kie Y. Ahn et al.

Examiner: Unknown

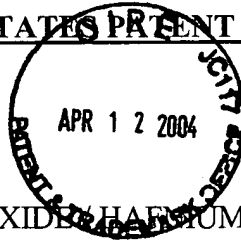
Serial No.: 10/602323

Group Art Unit: 2812

Filed: June 24, 2003

Docket: 1303.101US1

Title: LANTHANIDE OXIDE/HAFNIUM OXIDE DIELECTRIC LAYERS



COMMUNICATION CONCERNING RELATED APPLICATION(S)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicants would like to bring to the Examiner's attention the following related application(s) in the above-identified patent application:

<u>Serial/Patent No.</u>	<u>Filing Date</u>	<u>Attorney Docket</u>	<u>Title</u>
09/944981	August 30, 2001	1303.021US1	CRYSTALLINE OR AMOPHOUS MEDIUM-K GATE OXIDES, Y2O3 AND Gd2O3
09/945535	August 30, 2001	1303.026US1	HIGHLY RELIABLE AMORPHOUS HIGH-K GATE OXIDE ZrO2
10/028643	December 20, 2001	1303.030US1	LOW-TEMPERATURE GROWN HIGH QUALITY ULTRA-THIN CoTiO3 GATE DIELECTRICS
10/052983	January 17, 2002	1303.031US1	HIGHLY RELIABLE AMORPHOUS HIGH-k GATE DIELECTRIC ZrOxNy
10/027315	December 20, 2001	1303.033US1	LOW-TEMPERATURE GROWN HIGH-QUALITY ULTRA-THIN PRASEODYMIUM GATE DIELECTRICS
09/797324	March 1, 2001	303.717US1	METHODS, SYSTEMS, AND APPARATUS FOR UNIFORM CHEMICAL-VAPOR DEPOSITIONS
10/099194	March 13, 2002	1303.044US1	EVAPORATION OF Y-Si-O FILMS FOR MEDIUM-k DIELETRICS
10/081439	February 20, 2002	1303.046US1	EVAPORATED LaAlO3 FILMS FOR GATE DIELECTRICS

10/137058	May 2, 2002	303.802US1	ATOMIC LAYER DEPOSITION AND CONVERSION
10/137168	May 2, 2002	1303.048US1	METHODS FOR ATOMIC-LAYER DEPOSITION OF ALUMINUM OXIDES IN INTEGRATED CIRCUITS
10/137499	May 2, 2002	1303.050US1	ATOMIC LAYER-DEPOSITED LaAlO_3 FILMS FOR GATE DIELECTRICS
10/163481	June 5, 2002	1303.056US1	ATOMIC LAYER-DEPOSITED HfAlO_3 FILMS FOR GATE DIELECTRICS
10/163686	June 5, 2002	1303.059US1	Pr_2O_3 -BASED La-oxide GATE DIELECTRICS
10/209581	July 30, 2002	1303.061US1	ATOMIC LAYER DEPOSITED NANOLAMINATES OF $\text{HfO}_2/\text{ZrO}_2$ FILMS AS GATE DIELECTRICS
10/219870	August 15, 2002	1303.069US1	LANTHANIDE DOPED TiO_x DIELECTRIC FILMS BY PLASMA OXIDATION
10/219878	August 15, 2002	1303.070US1	LANTHANIDE DOPED TiO_x DIELECTRIC FILMS
10/229903	August 28, 2002	1303.078US1	ATOMIC LAYER DEPOSITED HfSiON DIELECTRIC FILMS
10/233309	August 29, 2002	1303.079US1	ATOMIC LAYER DEPOSITED LANTHANIDE DOPED TiO_x DIELECTRIC FILMS
10/309583	December 4, 2002	1303.082US1	ATOMIC LAYER DEPOSITED ZR-SN- TI-O FILMS USING TiI_4
10/309935	December 4, 2002	1303.083US1	ATOMIC LAYER DEPOSITED Zr-Sn- Ti-O FILMS
10/379470	March 4, 2003	1303.090US1	ATOMIC LAYER DEPOSITED DIELECTRIC LAYERS

COMMUNICATION CONCERNING RELATED APPLICATIONS

Serial Number: 10/602323

Filing Date: June 24, 2003

Title: LANTHANIDE OXIDE / HAFNIUM OXIDE DIELECTRIC LAYERS

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10/403734	March 31, 2003	1303.092US1	ATOMIC LAYER DEPOSITED ZrAl _x O _y DIELECTRIC LAYERS
10/420307	April 22, 2003	1303.097US1	ATOMIC LAYER DEPOSITED ZrTiO ₄ FILMS
10/602315	June 24, 2003	1303.107US1	LANTHANIDE OXIDE / HAFNIUM OXIDE DIELECTRICS
09/779959 6,495,436	February 9, 2001	Unknown	FORMATION OF METAL OXIDE GATE DIELECTRIC
09/838335 6514828	April 20, 2001	Unknown	METHOD OF FABRICATING A HIGHLY RELIABLE GATE OXIDE
09/881408	June 13, 2001	Unknown	DIELECTRIC LAYER FORMING METHOD AND DEVICES FORMED THEREWITH
09/908767 6534420	July 18, 2001	Unknown	METHODS FOR FORMING DIELECTRIC MATERIALS AND METHODS FOR FORMING SEMICONDUCTOR DEVICES
10/765619	January 27, 2004	1303.033US2	LOW-TEMPERATURE GROWN HIGH- QUALITY ULTRA-THIN PRASEODYMIUM GATE DIELECTRICS
10/768597	January 30, 2004	1303.033US3	LOW-TEMPERATURE GROWN HIGH- QUALITY ULTRA-THIN PRASEODYMIUM GATE DIELECTRICS
10/789042	February 27, 2004	1303.050US2	ATOMIC LAYER-DEPOSITED LaAlO ₃ FILMS FOR GATE DIELECTRICS
10/789044	February 27, 2004	1303.070US2	LANTHANIDE DOPED TiO _x DIELECTRIC FILMS

Unknown	October 10, 2003	Unknown	LANTHANIDE OXIDE/ ZIRCONIUM OXIDE ATOMIC LAYER DEPOSITED NANOLAMINATE GATE DIELECTRICS
10/052983	January 17, 2002	Unknown	HIGHLY RELIABLE AMORPHOUS HIGH K GATE DIELECTRIC ZROXNY
10/225715	August 21, 2002	Unknown	COMPOSITE DIELECTRIC FORMING METHODS AND COMPOSITE DIELECTRICS
10/352507	January 27, 2003	Unknown	ATOMIC LAYER DEPOSITION OF METAL OXYNITRIDE LAYERS AS GATE DIELECTRICS AND SEMICONDUCTOR DEVICE STRUCTURES UTILIZING METAL OXYNITRIDE LAYERS

Respectfully submitted,


KIE Y. AHN ET AL.

By Applicants' Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 371-2157

Date 8 April 2004

By

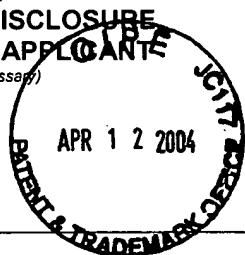

David R. Cochran
Reg. No. 46,632

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Judy Mosher
Name

Judy Mosher
Signature

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Use as many sheets as necessary)

Complete if Known

Application Number 10/602323

Filing Date June 24, 2003

First Named Inventor Ahn, Kie

Group Art Unit 2812

Examiner Name Unknown

Sheet 1 of 2

Attorney Docket No: 1303.101US1

US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document	Class	Subclass	Filing Date If Appropriate
	US-2003/0042526	03/06/2003	Weimer, Ronald A.	257	309	08/29/2001
	US-2003/0052356	03/20/2003	Yang, Haining , et al.	257	309	10/11/2002
	US-2003/0052358	03/20/2003	Weimer, Ronald A.	257	310	10/25/2002
	US-2003/0102501	06/05/2003	Yang, Haining , et al.	257	295	12/12/2002
	US-2003/0119313	06/26/2003	Yang, Haining , et al.	438	681	12/05/2002
	US-2003/0222300	12/04/2003	Basceri, Cem , et al.	257	309	03/13/2003
	US-2003/0228747	12/11/2003	Ahn, Kie Y., et al.	438	591	06/05/2002
	US-6,120,531	09/19/2000	Zhou, Lin , et al.	607	111	10/17/1997
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	US-6,518,610	02/11/2003	Yang, Haining , et al.	257	295	02/20/2001
	US-6,524,867	02/25/2003	Yang, Haining , et al.	438	3	12/28/2000
	US-6,573,199	06/03/2003	Sandhu, Gurtej S., et al.	438	798	08/30/2001
	US-6,593,610	07/15/2003	Gonzalez, Fernando	257	296	12/13/2001
	US-6,608,378	08/19/2003	Ahn, Kie Y., et al.	257	701	08/26/2002
	US-6,613,702	09/02/2003	Sandhu, Gurtej S., et al.	438	798	01/17/2003
	US-6,661,058	12/09/2003	Ahn, Kie Y., et al.	257	344	02/11/2002
	US-6,683,005	01/27/2004	Sandhu, Gurtej S., et al.	438	715	01/17/2003

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Foreign Document No	Publication Date	Name of Patentee or Applicant of cited Document	Class	Subclass	T ²
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OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		AARIK, JAAN , et al., "Influence of substrate temperature on atomic layer growth and properties of HfO/sub 2/ thin films", <u>Thin Solid Films</u> , 340(1-2), (1999), 110-116	

EXAMINER**DATE CONSIDERED**

Substitute Disclosure Statement Form (PTO-1449)

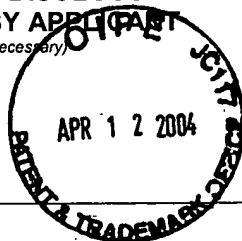
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STATEMENT BY APPLICANT**

(Use as many sheets as necessary)



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Application Number 10/602323

Filing Date June 24, 2003

First Named Inventor Ahn, Kie

Group Art Unit 2812

Examiner Name Unknown

Sheet 2 of 2

Attorney Docket No: 1303.101US1

		BENDORAITIS, J G., et al., "Optical energy gaps in the monoclinic oxides of hafnium and zirconium and their solid solutions", <u>Journal of Physical Chemistry</u> , 69(10), (1965),3666-3667	
		GUTOWSKI, M J., "Thermodynamic stability of high-K dielectric metal oxides ZrO/sub 2/ and HfO/sub 2/ in contact with Si and SiO/sub 2/", <u>Applied Physics Letters</u> , 80(11), (March 18, 2002),1897-1899	
		JEON, SANGHUN , et al., "Excellent electrical characteristics of lanthanide (Pr, Nd, Sm, Gd, and Dy) oxide and lanthanide-doped oxide for MOS gate dielectric applications", <u>Electron Devices Meeting, 2001. IEDM Technical Digest. International</u> , (2001),471-474	
		KUKLI, K , et al., "Comparison of hafnium oxide films grown by atomic layer deposition from iodide and chloride precursors", <u>Thin Solid Films</u> , 416, (2002),72-79	
		KUKLI, KAUP0 , et al., "Influence of thickness and growth temperature on the properties of zirconium oxide films growth by atomic layer deposition on silicon", <u>Thin Solid Films</u> , 410(1-2), (2002),53-60	
		KUKLI, K J., et al., "Properties of hafnium oxide films grown by atomic layer deposition from hafnium tetraiodide and oxygen", <u>Journal of Applied Physics</u> , 92(10), (November 15, 2002),5698-5703	
		POVESHCHENKO, V P., et al., "Investigation of the phas composition of films of zirconium, hafnium and yttrium oxides", <u>Soviet Journal of Optical Technology</u> , 51(5), (1984),277-279	
		ROBERTSON, J. , "Band offsets of wide-band-gap oxides and implications for future electronic devices", <u>Journal of Vacuum Science & Technology B (Microelectronics and Nanometer Structures)</u> , 18(3), (May-June 2000),1785-1791	
		SNEH, OFER , et al., "Thin film atomic layer deposition equipment for semiconductor processing", <u>Thin Solid Films</u> , 402(1-2), (Jan. 1, 2002),248-261	
		ZHANG, H , et al., "High permittivity thin film nanolaminates", <u>Journal of Applied Physics</u> , 87(4), (February 2000),1921-1924	

EXAMINER

DATE CONSIDERED

Substitute Disclosure Statement Form (PTO-1449)

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